REMARKS

The response to the Office Action was due on August 14, 2004. The response is being submitted within two months after this date, and a petition for an extension of time for two months is submitted with this response. Claims 1-49 were originally filed in United States Serial No. 09/940,901 on August 28, 2001. Claims 39-43, 45, 47 and 49 have been cancelled in this response. Reconsideration and allowance of claims 1-38, 44, 46 and 48 based on the amendments and remarks presented herein is respectfully requested.

Claim 1 has been amended to clarify that the deposition of pyrolytic carbon on inorganic particles having a high surface area results in high mass deposition per unit volume of starting material within a short period of deposition. The refractory inorganic seed particle becomes an insignificant fraction of the whole amount of pyrolytic carbon deposited on the surfaces on the particle. Specification Page 5, Lines 11-17

35 USC §112 REJECTIONS

Claims 1-38 and 41 have been rejected under 35 USC §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter, which Applicant regards as the invention, for reasons of record.

In response, Applicant submits a 37 CFR §1.132 affidavit in which Applicant-Inventor states the test method used to determine the surface area of the inorganic particles disclosed in the specification is the BET surface area test method. Further it is stated that the BET method of measuring the surface area of inorganic particles is the method most widely used and accepted by those having ordinary skill in the industry. It is much more accurate for measuring high surface area of particles than calculating surface area by measuring particle size and dimension.

It has further been alleged that claim 41 recites the "pure pyrolytic carbon of claim 30" but that claim 30 is drawn to a process. Claim 41 has been cancelled in the present response.

Applicant therefore respectfully submits that the claims, as amended, meet the requirements of 35 USC §112, second paragraph.

35 USC §102 REJECTIONS

Claims 1-13, 7-9, 12, 21, 22, 28-38, 41 and 44 have been rejected under 35 USC §102(b) as being anticipated by Funkenbusch, et al. (U.S. Patent No. 5,254,262). It has been alleged that Funkenbusch et al. disclose methods for the production of pyrolytic carbon-coated inorganic oxide particles, and that these inorganic oxide particles are taught as having diameters of about 1-500 micrometers and surface areas of 5-300 m^2/g. It has further been alleged that the methods disclosed comprise vapor deposition of carbon using hydrocarbons as the carbon source at temperatures of between 500° and 1500° C, and as producing carbon coatings of up to 20 Angstroms thick.

It has additionally been alleged that, while Funkenbusch, et al. is silent regarding the structure of the carbon formed, it is assumed that the structure would inherently be one of the three claimed in rejected claim 35. Further, since the thickness of the carbon formed by the reference is of the order of one atomic layer to 20 Angstroms, this carbon is seen as amorphous, since little opportunity for crystal growth is afforded with layers of such dimensions. It is also stated, that the claim language is not seen as excluding a noncarbon core which makes up a substantial percentage of the overall particle, but only requiring that the carbon layers produced are of such purity.

Applicants respectfully traverse the rejection of claims 1-3, 7-9, 12, 21, 22, 28-38, 41 and 44 under 35 USC §102(b) as being anticipated by Funkenbusch et al. for the reasons set forth below.

Funkenbusch et al. does not disclose or teach a process for producing substantially pure pyrolytic carbon. Rather, it discloses a, "chromatographic support material which comprises a particle, preferably a spherical particle, or "spherule" which comprises a core base or substrate of a porous zirconium oxide and a cladding of carbon over the porous core. As it is intended to be used as support material in liquid chromatography applications, it is preferred that the individual units of the material be spherical in shape in order to permit optimal packing into a column." Col. 9, Lines 1-8 This is in contrast to the present process which takes advantage of the new availability of ultra-fine refractory inorganic particles which exhibit a very high surface area to volume ratio and therefore may serve as (seed) particles on which to deposit pyrolytic carbon. Specification Page 5, Lines 9-11

Funkenbusch et al. additionally does not teach the production of substantially pure pyrolytic carbon by depositing pyrolytic carbon on inorganic particles having a high surface area, which results in extremely high mass deposition rates per unit volume of starting material within a short period of deposition, such that the refractory inorganic seed particle becomes an insignificant fraction of the whole amount of pyrolytic carbon deposited on the surface of the particle. Specification Page 5, Lines 11-17.

In contrast, Funkenbusch et al. teaches that the bulk part of its chromatographic support material is zirconium oxide (ZrO_2) material, rather than pyrolytic carbon, "Preferably the thickness of the carbon cladding over the surface of the ZrO_2 core ranges from the diameter of a single carbon atom (a monatomic layer) to about 20 Angstroms. This carbon cladding will thus not appreciably increase the diameter of the spherules." Col. 7, Lines 7-11 Therefore, Funkenbusch et al. does not produce a substantially pure pyrolytic carbon, but rather a thinly carbon coated ZrO_2 spherule useful as a chromatographic support material and therefore does not teach or anticipate claims 1-3, 7-9, 12, 21, 22, 28-38 and 44.

Claims 32-45 have been rejected under §102(b) as being anticipated by Alig et al. (U.S. Patent No. 5,374,415). It has been alleged that Alig et al. discloses methods for the

production of carbon fibers by pyrolytic processes using natural gas as the carbon source in reaction temperatures such as claimed in the present application. Additionally, it is alleged that these fibers are taught as having diameters as small as 0.05.

Alig et al. does not teach or disclose a substantially pure bulk pyrolytic carbon which is produced from the present process. Rather, Alig et al. teaches the inorganic particle which itself is used in the present process, being exposed to hydrocarbon gas sufficient to deposit a substantially uniform layer of carbon on the particles. As stated in the specification; "Although vapor-grown carbon whiskers are used in the process, the present process is not limited to vapor-grown carbon whiskers and thus other types of carbon fibrules, filaments, fibroids, whiskers, microfibers, nanofibers, including but not limited to those prepared by the methods disclosed by U.S. Patent No. 5,374,415 (Alig et al.); U.S. Patent No. 5,691,054 (Tennent et al); and U.S. Patent No. 4,663,230 (Tennent) may comprise the carbon whisker component of the process of the present process." Specification Page 7, Lines 18-25

Therefore, Alig et al. does not teach or anticipate the substantially pure bulk pyrolytic carbon produced by the present process of claims 32-38 and 44 but rather the inorganic seed particles that could be used to form such a bulk pyrolytic carbon.

Claims 48 and 49 have been rejected under 35 USC §102(b) as being anticipated by Tanaka et al. (U.S. Patent 5,344,726). It has been alleged that Tanaka discloses battery electrodes which comprise pyrolytic carbon and while the process of producing the carbon differs from that of the present process patentably distinct properties will only be considered upon a showing of such properties arising from the present processes.

Tanaka discloses a carbon anode for a secondary battery in which a carbon-active material of the carbon anode is covered with amorphous carbon. Tanaka teaches, "It is preferable that the amorphous carbon covering the surface is as thin as possible...." Col. 2, Lines 50-51 It does not disclose an electrode that comprises substantially pure bulk pyrolytic carbon produced by the deposition of pyrolytic carbon on inorganic particles having

a high surface area that results in extremely high mass deposition rates per unit volume of starting material. Specification Page 5, Lines 11-13 Therefore, there is no teaching in Tanaka et al. to anticipate an electrode produced by the present process that is comprised of substantially pure pyrolytic carbon as in claim 48.

35 USC §103 REJECTIONS

Claims 26 and 27 have been rejected under 35 USC §103(a) as being unpatentable over Funkenbusch et al. (U.S. Patent No. 5,254,262) in view of Alig et al. (U.S. Patent No. 5,374,415). It has been alleged that Funkenbusch et al. discloses a process for the production of pyrolytic carbon and that it fails to explicitly recite the carbon sources claimed in claims 26 and 27 of the present application. It is further alleged that Alig et al. teaches that many other hydrocarbons, including those claimed in the present process, are suitable for the production of pyrolytic carbon, and therefore it would have been obvious to one of ordinary skill in the art to substitute the hydrocarbons taught by Alig et al. in the processes of Funkenbusch et al. with the reasonable expectation that suitable products would result.

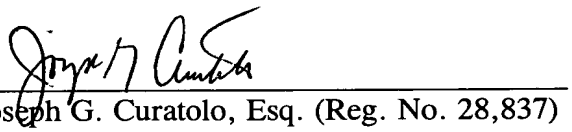
As stated above, Funkenbusch discloses a method for forming a chromatic graphic support material, wherein that material comprises a particle, preferably a spherical particle, comprising a core base or substrate of a porous ZrO_2 in a cladding of carbon over the porous core (Col. 6, Lines 1-4) wherein preferably the thickness of the carbon cladding over the surface of the ZrO_2 core ranges from the diameter of a single carbon atom (a monatomic layer) to about 20 Angstroms. This carbon cladding will thus not appreciably increase the diameter of the spherules. Col. 7, Lines 7-11 Alig discloses a process for the preparation of carbon fibers which can be used as inorganic particles in the present process. Therefore, there is no suggestion or enablement in either Funkenbusch et al. or Alig et al. to use the hydrocarbon gases of claim 26 or 27 in the present process for producing substantially pure pyrolytic carbon, wherein the ultra-fine refractory inorganic particles have a very high surface area to volume ratio as a seed particle on which to deposit pyrolytic carbon. Specification Page 5, Lines 9-12

Claims 46-47 have been rejected under 35 USC §103(a) as being unpatentable over Alig et al. (U.S. Patent No. 5,374,415). It has been alleged that Alig et al. discloses carbon fibers, and, while the reference fails to explicitly recite thermoplastic resins incorporating these fibers, the discussion of the use of carbon fibers, makes obvious thermoplastic compositions comprising pyrolytic carbon fiber.

As discussed previously Alig et al. discloses carbon fibers (Specification Page 7, Lines 18-25) which can be used in the present process as the inorganic seed particle which is exposed to a hydrocarbon gas. There is no suggestion or enablement in Alig et al. for a process that uses inorganic particles to produce substantially pure bulk pyrolytic carbon that can be used as a filler to form thermoplastic compositions.

In view of the amendments and remarks contained above, Applicants respectfully request reconsideration of the application, withdrawal of the 35 USC §102, §103 and §112 rejections, and request that a Formal Notice of Allowance be issued for claims 1-38, 44, 46 and 48. Should the Examiner have any questions about the above amendments and remarks, the undersigned attorney would welcome a telephone call.

Respectfully submitted,



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10-1-2004
Date